

## ATTACHMENT B

### REMARKS

By this amendment, Applicants have made a minor amendment to Claim 7 to overcome an objection. For reasons as stated in detail below, Applicants submit that the present claims are not disclosed or suggested in the cited references, and that the application is now in condition for allowance.

In the Official Action, the Examiner made a minor objection to a typographical error in Claim 7 and this objection has now been overcome by the present amendment.

In the Official Action, the Examiner also rejected Claims 1-6 under 35 U.S.C. § 102 on the basis of Logsdon US Patent 4,876,402, Claims 7, 8 and 10 on the basis of JP 6-22870 in view of Logsdon, and Claims 9, 11 and 12 on the basis of the combination of references cited against Claims 7 and 10, further in view of EP 1192981. These rejections are respectfully traversed for the reasons as stated below.

#### (1) The Present Invention

The present invention is directed to a desulfurizing agent manufacturing method comprising mixing a mixture containing a copper compound and a zinc compound with an aqueous solution of an alkali substance to prepare a precipitate, calcining the resultant precipitate, forming the calcined precipitate into a shaped form of a copper oxide – zinc oxide mixture, impregnating the shaped form with iron and/or nickel, calcining the impregnated form to produce a calcined oxide, and reducing the calcined oxide with hydrogen.

According to the present invention, an agent having a special property can be obtained because of the process comprising the specific steps of the invention.

In particular, the agent of the invention is superior in terms of hydrocarbon desulfurization performance.

Accordingly, these agents show the ability to permit highly desulfurized hydrocarbons to be obtained easily and in a stable manner over a long period of time by using small quantities of these desulfurizing agents. Even in cases where catalysts that are susceptible to sulfur poisoning are used in the steam reforming of hydrocarbon raw material, etc., the deleterious effects of sulfur can be eliminated to a great extent; e.g., sulfur poisoning can be virtually completely prevented.

The above mentioned characters (i.e., desulfurizing property) cannot be achieved without the process of the present invention. Even if a composition contains copper, zinc and nickel (or iron), the composition fails to show the desulfurizing property of the present invention since the composition is not prepared by the process of the present invention and does not have the properties of the desulfurizing agent of the present invention.

This fact is clear from the Comparative Example 5 in the present specification. In the Comparative Examination 5, the agent containing copper, zinc and nickel is prepared. However, the CO concentration in the outlet gas was 1.5 vol%, and a temperature rise caused by a methane forming reaction was observed.

Thus, since the "desulfurizing agent" plus "the specific process" are important features and limitations of the present invention, the excellent desulfurizing property can be achieved only through the workings of the invention. In short, the "desulfurizing" and "the specific process" are inseparably combined in the present invention.

(2) The Cited References

(a) Logsdon

Logsdon discloses an improved vapor phase catalytic hydrogenation of aldehydes to the corresponding alcohols wherein the improvement comprises employing a copper oxide-zinc oxide catalyst impregnated with a selectivity enhancer selected from the group consisting of an alkali-metal, transition metal and mixtures thereof.

However, Logsdon merely discloses an improved vapor phase catalytic hydrogenation of aldehydes to the corresponding alcohols. Needless to say, this reaction is totally different from "desulfurizing". Those skilled in the art would not expect "desulfurizing agent" from Logsdon directed only to "hydrogenation".

In Logsdon nickel, cobalt etc. are used as a "selectively enhancer" in hydrogenation of aldehydes ( $R-CHO-R-CH_2OH$ ). (See column 2, line 55 to column 56, line 5, claims 1-10). A person of ordinary skill in the art would not expect to use these elements for sulfurizing of hydrocarbon.

Additionally, the subject matter of Logsdon is to improve the composition, not to improve the method for preparing the composition. In other words, Logsdon merely mentions a broad concept in terms of a method for preparing the composition. Since the important feature of Logsdon is the composition itself, it is not necessary to limit the condition of the preparing method at all.

In contrast, the excellent desulfurizing property can be achieved by the agent produced by the process of the present invention. Unless the agent is produced by the process, the property cannot be obtained.

Those skilled in the art would not expect the preparation of the desulfurizing agent from Logsdon where merely discloses the hydrogenation catalyst.

(b) JP-06-22870

JP-06-22870 discloses a desulfurization of feedstock for fuel cell.

However, JP-06-22870 fails to disclose or suggest the process of the present invention despite the fact that this reference sets forth a different desulfurizing agent consisting of copper, nickel and zinc oxide.

Even in Example 1 of JP-06-22870, the agent was produced from a mixed aqueous solution containing not only copper nitrate and zinc nitrate but also nickel nitrate. When the solution contains nickel, the desired agent and the excellent desulfurizing property cannot be obtained such as shown in Comparative Example 5 in the present specification. Accordingly to the Comparative Example 5 (the preparation of a desulfurizing agent from the mixed aqueous solution containing copper nitrate, zinc nitrate and nickel nitrate), the CO concentration in the outlet gas was 1.5 vol%, and a temperature rise caused by a methane forming reaction was observed.

Thus, there is no disclosure or suggestion in JP-06-22870 about the process of the present invention, much less any disclosure or suggestion of the advantages realized by the process.

(c) EP-1192989

EP-1192989 discloses a method of desulfurization of town gas not containing hydrogen, characterized in that the desulfurizing is carried out by adding hydrogen to the town gas, and by using copper-zinc desulfurizing agent prepared by co-precipitation method.

However, EP-1192989 is totally silent about the use of iron or nickel. EP-1192989 merely discloses Cu-Zn desulfurizing agent or Cu-Zn-Al desulfurizing agent (see claims 1-8, examples of EP-1192989).

Therefore, the desulfurizing method using Cu-Zn or Cu-Zn-Al is different from the method of the present invention.

The use of iron or nickel for desulfurizing and the advantage thereby would not be expected by a person of ordinary skill in the art.

As stated above, Logsdon, which is directed to "hydrogenation of aldehydes", is totally different from the present invention essentially requiring "desulfurization" as well as "the specific process".

In addition, no motivation to conceive the present invention would stem from a combination of Logsdon, which aims to "hydrogenation of aldehydes", with JP-06-22870 or EP-1192989, directed to "desulfurization", because the "hydrogenation" is definitely different than "desulfurization".

Thus, none of the cited references, either singly or in combination, disclose or suggest the presently claimed invention, nor is there any motivation to combine references to come up with the present invention.

Accordingly, the present claims are not anticipated or made obvious by the cited references and are thus patentable over the cited references. The Examiner's rejections on the basis of these references are thus respectfully traversed and should be withdrawn.

In light of the amendments and arguments as set forth above, Applicants submit that the present application overcomes all prior rejections and has been placed in condition for allowance. Such action is earnestly solicited.

**END REMARKS**